by the beryllium window; neither have other elements with characteristic peaks in strongly overlapping spectral regions, such as chlorine. The X-ray photoelectron spectra were conclusive on this point.

As data which are summarised in Table III show, a substantial proportion of sodium, chlorine, nitrogen and sulphur, and lesser amounts of nickel and platinum were detected. Judging from the binding energy values, the chemical states of these elements seem to be Na^+ and PtO_2. In order to understand which salts are dominant an estimation of the atomic ratios of these elements has been calculated. The Na:Cl and Ni:(N + S) ratios, determined from the intensity ratios and published atomic sensitivity factors (20) for these levels, were 1.07 and 0.87, respectively. These results suggest that the most plausible Ni^{2+} salts are nitrates and sulphates, while sodium chloride seems to be the most abundant sodium salt. The origin of sodium chloride in the filter is difficult to explain in the light of the above results alone, and further research is needed to understand the route by which this salt is incorporated into the outlet stream.

Conclusions

The data presented here legitimise the statement that the powder weakly held on the catalyst gauzes is composed of rhodium-enriched oxidised particles and impurities, mainly α-Fe_2O_3, arising from reactor materials. The powder on the catchment gauzes comes mainly from the catalyst gauzes, carried by the gas stream. The additional deterioration of Megapyr, Nichrome and Stellite contributes to the increase in the impurities which accumulate downstream. Because the temperature in the first heat exchangers is sufficiently low the volatile oxides PtO_2 and PdO condense, thus giving support to the mechanisms currently proposed to account for the platinum and palladium losses. In the final filter impurities accumulate, some of which result from the polluted air, others from the reactor materials and yet others resulting from interaction with the reaction products.

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Electroless Osmium Deposition

The unique properties of osmium including hardness, high reflectivity, extremely high melting point, and good chemical resistance make it a suitable material for use in non-oxidising atmospheres. None the less it does not find wide industrial application. A recent communication from the National Tsing-Hua University, Taiwan, however, reports the successful deposition of an amorphous osmium thin film on to single crystal silicon by electroless deposition from a hypophosphite-based bath (Y.-S. Chang and M.-L. Chou, *Mater. Chem. Phys.*, 1989, **24**, (1–2), 131).

The process ensures the cleanliness of the interface between the osmium and the silicon. The interface is abrupt, flat and without porosity, and annealing techniques may facilitate the growth of epitaxial silicide/silicon Schottky diodes. Tentative mechanisms for the growth of the film are proposed and discussed.